High effective harvesting of microalgae Chlorella prothotecoides via flocculation with cationic starch

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Publication date:
2013

Document Version
Publisher's PDF, also known as Version of record

DTU Environment
Department of Environmental Engineering

Technical University of Denmark

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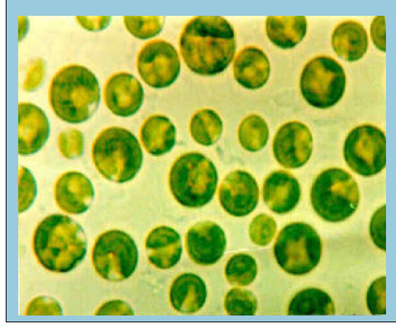
Introduction

Microalgal harvesting step accounts up to 30 % of the total cost of biomass production.

The aim of the study was to investigate the effect of an organic polymeric flocculant, Greenfloc 120, to flocculate microalgal species *Chlorella protothecoides*. Effect of pH on the flocculation process under optimal flocculant level was also investigated.

Materials and Methods



Flocculation efficiency (FE) was calculated as:

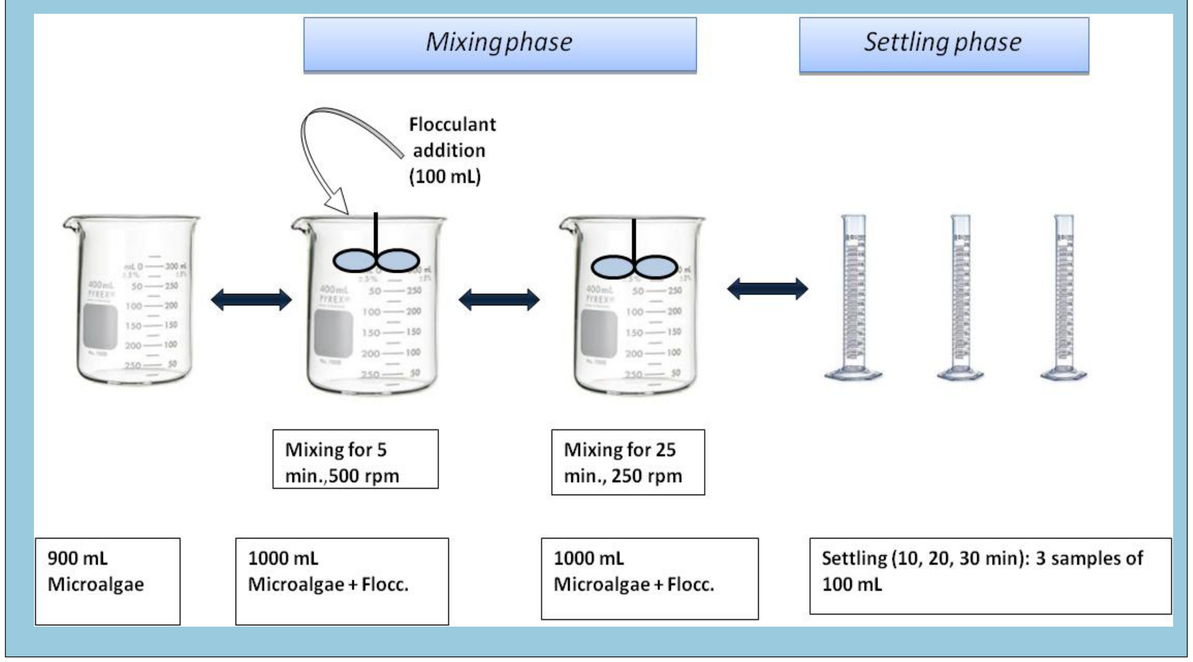
$$FE\ (\%) = \frac{OD_{550}(t_0) - OD_{550}\,(t)}{OD_{550}(t_0)} * 100$$

where:

OD_{550} (t_0): OD_{550} before flocculant addition

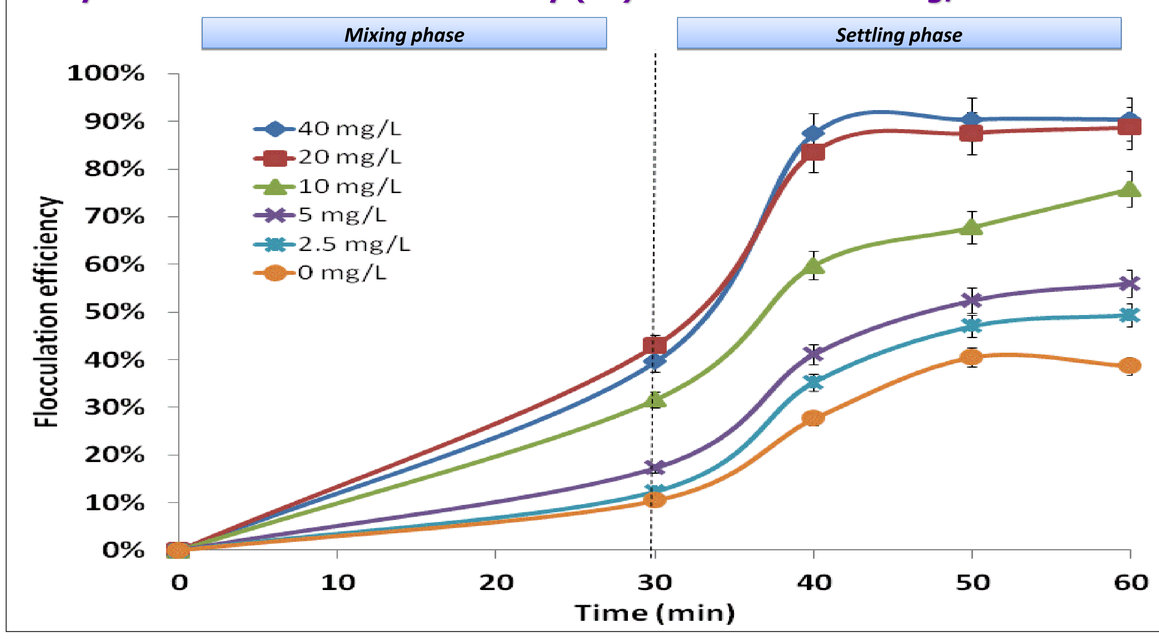
OD_{550} (t): OD_{550} after flocculant addition

Experimental setup



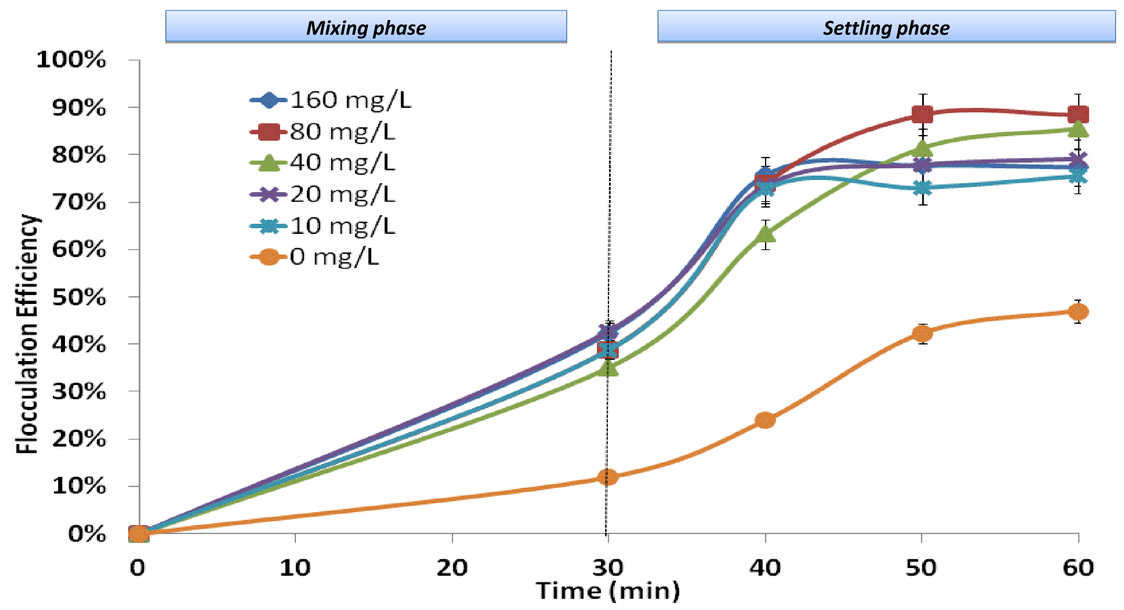
Results

Dynamics of flocculation efficiency (FE):biomass 0.44-0.72 g/L



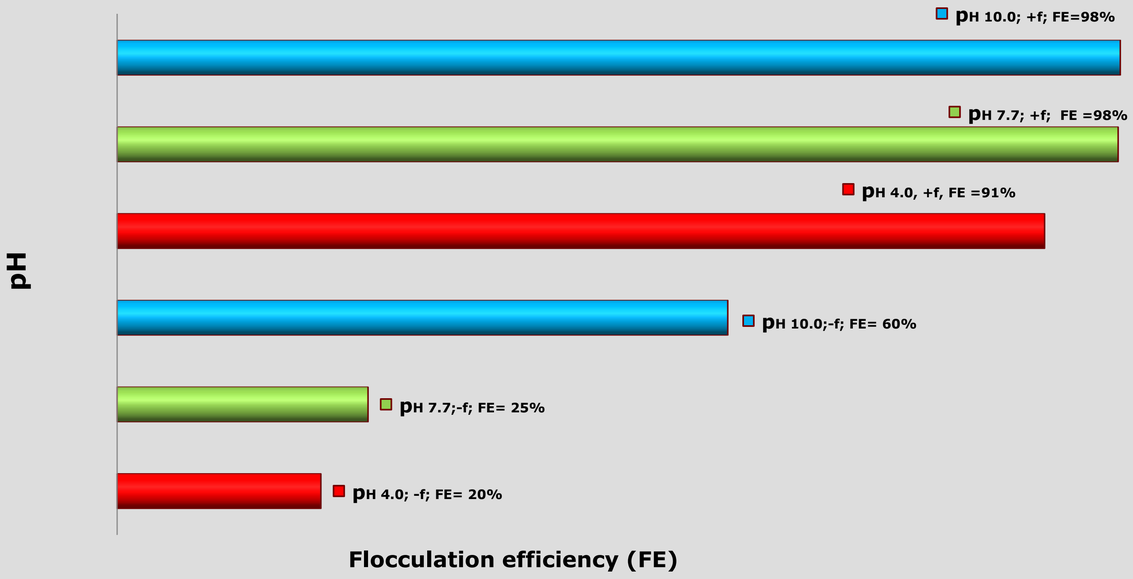
Results

Dynamics of flocculation efficiency (FE): biomass 0.78 g/L



Results

Effect of pH on flocculation effciency: biomass 1.1 g/L



Conclusions

This study demonstrated Greenfloc 120 as a promising agent for flocculation of *Chlorella protothecoides* at neutral and high pH.

It can be concluded that:

- **40 mg flocculant/L**: optimal level (FE> 80 %) for biomass concentrations 0.44-0.72 g/L
- **80 mg flocculant/L**: optimal level (FE> 80 %) for biomass concentration 0.78 g/L

The best results were obtained at:

- **pH 10** (FE=60-73 %) in absence of flocculant
- **pH 7.7** and **pH 10** (FE=91-98 %) in presence of flocculant (40 mg /L)

Acknowledgments

This work was supported by Danish Research Council for Strategic Research (Jr. nr. 09-067601).